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north and south coasts. Especially since steam navigation has reduced the number of hands needed on the ships, the maritime interests of Brittany have considerably declined. Now the Briton of the *Ar Coat* enters the navy of his country, serves his term, and retires to his farm to live on his pension upon completion of his service. Very much the same is the life of the fisherman. Coastal fisheries dominate by far over deep sea fishing, the vessels going to Iceland hailing from two, and those going to the Banks from three ports only.

By far the most important fishing industry are the sardine fisheries, which have almost revolutionized the social and economic conditions of the regions which they influence. The cause lies in the fact that the sardine fisherman cannot, like the one who goes for other fishes, land his catch at his native port and take it to the nearest market. The sardine is so perishable that it must be put up almost immediately after having been caught, therefore its catchers must live as near the factory as possible, so that the sardine ports have become the only places in Brittany with a landless population, the only places on the *Ar Mor* where the type of the farmer-mariner is missing. Moreover, even if there were room enough for everybody to have his lot, there would be nobody to take care of it because, sardine canning being pre-eminently a feminine industry, every wife or daughter is working at the factory. The result is, that here alone has developed a modern proletariate which even the destitute conditions of the poorest parts of the *Ar Coat* have not been able to produce.

Aside from these agglomerations of the sardine centers Brittany is poor in cities of any considerable size. The stimulus of through traffic wanting, the towns are either small local centers on country cross roads whose importance is mostly based on market privileges, or small fishing ports at the heads of estuaries, none of them having over 20,000 inhabitants. The lack of contact with each other and with the outside world has worked as a heavy drawback with regard to almost every problem of public life. Hence Brittany is to this day the country of "survivals," economically, socially, linguistically. Even its great natural blessing, the prolificness of its population whose birthrate surpasses that of every other part of France, acts as a hindrance to its progress because it supplies an abundance of cheap labour which stands in the way of the introduction of modern methods and machinery which would develop its natural resources. For with all its overpopulation, the author is confident that the peninsula can be made to support every one of her sons and daughters, and even a larger population than at present if only it could be more scientifically exploited. A well-devised system of railroads which would open up the country and connect it with the modern world is the greatest need for its near future.

The text is supplemented by a series of maps and diagrams which add greatly to the usefulness of the book which, as a whole, must be ranked with the best productions of the last years in the large and important field of "Länderkunde."

M. K. G.

The Physics of Earthquake Phenomena. By Cargill Gilston Knott. xii and 283 pp., Illustrations, and Index. The Clarendon Press, Oxford, 1908. Price, $4.75.

This work embodies the Thompson lectures given at the United Free Church in Aberdeen in the year 1905-1906. The author was for several years professor of physics in the University of Tokyo, where he was associated with Milne and closely followed the development of seismology in Japan. The introduction reviews the conditions of the earth's crust which lead to strain, flow, folding and faulting, these being fundamental to earthquake agitation. The author then outlines the sensible phenomena of shocks. Among these are sounds, caused by the refraction into the air of perhaps less than one thousandth part of the wave energy that affects the rocks. Alluvial soils kill sound vibrations while harder strata are likely to communicate them. Wave motions of the ground are undoubted, but their height is likely to be exaggerated, since no fixed vertical line serves as a standard of comparison. Whirling motions and the twisting of monuments or the shearing of neighbouring areas without faulting are the natural result of interfering trains of waves, producing a vortex.

Professor Knott holds to the conception of the epicenter, or epifocal tract, which is readily determined in inhabited regions. He recognizes, however, that exact localization is difficult because there may be two or more centers and the disturbance may be extended in a linear manner. Thus eisoseisms are not often circular. Sub-oceanic origins are naturally difficult to localize. These considerations are given in a chapter on seismic surveys which also records efforts to determine intensities by dynamic means rather than by an imperfect scale based on human sensations and observations of injured structures. Under instrumental seismology is described the development of seismometers, following the simple seismoscopes which only record the occurrence without noting or recording the successive intensities. It is believed that the modern seismograph responds with "fair accuracy" to the motion of the ground.

While most of the destructive shocks occur in regions of earthquake frequency, there are exceptions, as at Comrie in Scotland and the Lisbon catastrophe of 1755. De Ballore is quoted as discarding the effort to show distribution over the world by continuous seismic lines, that investigator having adopted a discontinuous plan of marking seismicity of localities by black disks of differing radii. Accurate mapping of distribution is of course hindered by the existence of non-inhabited regions and by the great extent of the ocean surfaces of the Globe. Observations on ships cannot afford as secure data as those made on land and some parts of the ocean are visited by but few ships.

Considerable space is given to the discussion of periodicities. Two factors determine the frequency of shocks, viz.: "seismic sensitiveness," a condition belonging within the earth's crust; and stresses derived from some source, such as planetary bodies or atmospheric pressures. The author recognizes a winter maximum of shocks and thinks it is connected with the summer and winter shifting of areas of high pressure between the continents and the oceans. The gradient along the shorelines is steeper in winter than in summer and this condition coöperates with the instability of the crust in such regions. Influence is also conceded to the falling and melting of snows, while the periodicity of rain and of snow-melting may also affect shoreline deposits and thus influence the isostasy of land masses.

It is now well known that instruments record a great number of vibrations which are not felt by man and are not "shocks" in the ordinary sense. It was Milne who, as long ago as 1883, thought it not unlikely that instruments might yet detect a large earthquake at any point on the lands of the globe. Six years later, at Potsdam, a disturbance was recognized as centering in Japan. Several sample records are reproduced in the text and an exposition of their meaning is given. Elasticity, elastic waves, and seismic radiations, each have chapters, with physical discussions of a technical character.

Under "miscellaneous relations" we find references to destruction of buildings and the snapping of submarine cables. Milne has shown that on an average there is every year one dislocation for every 434 miles of cable, a result which seems to follow naturally from the sub-oceanic origin of a majority of shocks. The connection between volcanoes and earthquakes is regarded as minor and local. The author does not favour the theory of Dr. See with reference to the percolation of sea water and the action of steam as a common cause of volcanoes and earthquakes. The volume closes with a brief notice of theories of the earth's interior in relation to seismic activities. It is held that the interior may be plastic under the action of long-continued forces and yet highly elastic to rapid vibratory motions. A. P. B.

Lands Beyond the Channel. An Elementary Study in Geography. By H. J. Mackinder. xii and 276 pp., Illustrations, Maps and Index of Place Names. George Philip & Son, Ltd., London, 1908. Price, 1s. 9d.

This book, a companion volume to Mackinder's "Our Own Islands," is a real geographical reader adapted to the interests and needs of children of the intermediate and upper grammar grades. Devoted to the salient geographical features of the continent of Europe and of the lands bordering the Mediterranean, it is not a mere series of scrappy descriptions of glimpses of physical features. Although written in part as if the readers were taking railway journeys, the volume is not a guide book or a railway folder in tone or scope. The book is written by a master who sees human, geographic relations in the landscapes he pictures and whose eyes have evidently always been open to the features of real geographic significance. Enough history is included to make clear the larger problems of the distribution of races, languages and religions in Europe to-day—a necessary foundation for understanding existing political conditions.

The volume is as interesting for an adult as for a child, for it is clearly written, well printed and illustrated by many maps and illustrations. It is not and does not pretend to be a textbook or reference volume. It is merely a "supplementary reader," but it is the most satisfactory book of its kind we know.

R. E. D.

Early New England Towns. A Comparative Study of their Development. By Anne Bush MacLear. 181 pp., and Maps. Columbia University. Longmans, Green & Co., Agents, New York, 1908. Price, $1.50.

Salem, Dorchester, Watertown, Roxbury and Cambridge are the chief subjects of this study. The origin and general government of these and other communities are set forth and there follow several chapters of a special character on town courts, finances and lands, on town government in detail, and on churches and schools. The author states that the characteristic features of the New England town of the seventeenth century resulted, in part at least, from the topography of the country, and that the colonists were forced, not only for protection but by the geographical features of the land, to dwell in groups. It would have added to the interest of the monograph if these statements had been interpreted and the influential geographic conditions set forth. A volume apparently prepared with conscientious study of the historical data, but so devoid as this of the atmosphere of geography, illustrates the importance to the historian of training in geographic principles. With such training, environment assumes its due importance and the human annals rest on a suitable foundation. Perhaps the nearest approach to geographic material is found in the chapter on town lands, and in the sketch maps which show the allotment of home lots, planting fields and commons for Cambridge and Watertown. A. P. B.